

AMENDMENTS
In the Claims

Current Status of Claims

1 1.(original) A composition comprising brine solution including an effective amount of a divalent
2 cation, at least one pollutant and having a salinity between about 3% and about 15%, where the
3 effective amount of the divalent cation is sufficient to produce a divalent to monovalent cation mole
4 ratio of at least 0.05 in the brine solution and where the brine solution is capable of supporting and
5 sustaining growth of a microbial culture capable of degrading the at least one pollutant.

1 2.(original) The composition of claim 1, wherein the divalent cation is selected from the group
2 consisting of Mg^{2+} , Ca^{2+} , Sr^{2+} , Ba^{2+} , and mixtures or combinations thereof.

1 3.(original) The composition of claim 1, wherein the divalent cation is selected from the group
2 consisting of Mg^{2+} , Ca^{2+} , Sr^{2+} , and mixtures or combinations thereof.

1 4.(original) The composition of claim 1, wherein the divalent cation is selected from the group
2 consisting of Mg^{2+} , Ca^{2+} , and mixtures or combinations thereof.

1 5.(original) The composition of claim 1, wherein the divalent cation is Mg^{2+} .

1 6.(original) A brine solution comprising a divalent to monovalent cation mole ratio of at least
2 0.05 and having a salinity greater than or equal to about 3%, where the brine solution is capable of
3 supporting and sustaining microbial growth.

1 7.(original) The composition of claim 6, wherein the divalent cation is selected from the group
2 consisting of Mg^{2+} , Ca^{2+} , Sr^{2+} , Ba^{2+} , and mixtures or combinations thereof.

1 8.(original) The composition of claim 6, wherein the divalent cation is selected from the group
2 consisting of Mg^{2+} , Ca^{2+} , Sr^{2+} , and mixtures or combinations thereof.

1 9.(original) The composition of claim 6, wherein the divalent cation is selected from the group

2 consisting of Mg²⁺, Ca²⁺, and mixtures or combinations thereof.

1 10.(original) The composition of claim 6, wherein the divalent cation is Mg²⁺.

1 11.(original) The composition of claim 6, wherein the brine solution has a salinity between about
2 3% and about 15%.

1 12.(original) The composition of claim 6, wherein the brine solution has a salinity between about
2 3% and about 13%.

1 13.(original) The composition of claim 6, wherein the brine solution has a salinity between about
2 3% and about 10%.

1 14.(original) A method comprising the steps of:

2 feeding a contaminated brine solution to a biological reactor containing a mixed bacterial
3 culture capable of degrading at least one contaminant under anoxic/anaerobic conditions;
4 adding an effective amount of a divalent cation precursor to the reactor, where the effective
5 amount of the divalent precursor is sufficient to maintain a divalent to monovalent cation
6 mole ratio at a numeric value greater than or equal to about 0.05,
7 degrading the contaminant in the contaminated brine solution for a time and at a temperature
8 sufficient to reduce a concentration of the contaminant at or below a desired concentration
9 while maintaining a suitable nutrient environment in the reactor and while maintaining the
10 ratio greater than or equal to about 0.05.

1 15.(original) The method of claim 14, wherein the reactor is sealed to reduce or eliminate oxygen
2 from the reactor.

1 16.(original) The method of claim 14, further comprising the step of:

2 sparging or purging the reactor with an oxygen-free gas after feeding the brine solution and
3 optionally during the degrading step.

1 17.(original) The method of claim 14, wherein the gas is selected from the group of nitrogen,
2 argon, and mixtures and combinations thereof.

1 18.(original) The method of claim 14, wherein the divalent cation precursor is selected from the
2 group consisting of a soluble Mg²⁺ salt, a soluble Ca²⁺ salt, a soluble Sr²⁺, a soluble Ba²⁺ salt, and
3 mixtures or combinations thereof.

1 19.(original) The method of claim 14, wherein the divalent cation precursor is selected from the
2 group consisting of a soluble Mg²⁺ salt, a soluble Ca²⁺ salt, a soluble Sr²⁺, and mixtures or
3 combinations thereof.

1 20.(original) The method of claim 14, wherein the divalent cation precursor is selected from the
2 group consisting of a soluble Mg²⁺ salt, a soluble Ca²⁺ salt, and mixtures or combinations thereof.

1 21.(original) The method of claim 14, wherein the divalent cation precursor is a soluble Mg²⁺ salt.

1 22.(original) The method of claim 14, wherein the contaminant is selected from the group
2 consisting of perchlorate, nitrate and mixture or combinations thereof.

1 23.(original) The method of claim 22, wherein the nutrient environment comprises adding an
2 inorganic energy source or an organic energy source in amounts greater than a stoichiometric amount
3 of electrons required to reduce the perchlorate and/or nitrate present in the brine solution for
4 sustained microbial growth during the degrading step.

1 24.(original) The method of claim 23, wherein the inorganic energy source is selected from the
2 group consisting of H₂ gas, a hydrogen delivery chemical, and mixtures or combinations thereof.

1 25.(original) The method of claim 23, wherein the organic energy source is selected from the group
2 consisting of acetate, ethanol, methanol, lactate, and mixtures or combinations thereof.

1 26.(original) The method of claim 14, wherein the contaminated brine solution is a perchlorate

2 and/or nitrate contaminated ion-exchange regenerate brine.

1 27.(original) A method comprising the steps of:

2 passing a waste water stream including at least one ion-exchangeable pollutant through an
3 ion-exchange resin able of exchanging the pollutant ion for a non-pollutant ion for a predetermined
4 time or until the resin is no longer to exchange the pollutant ion with the non-pollutant ion;

5 stopping the waste water stream from passing through the resin;

6 passing a brine solution through the resin for a time sufficient to exchange all or substantially
7 all of the pollutant ion with the non-pollutant ion to form a pollutant contaminated brine solution;

8 adding an effective amount of a divalent cation to the pollutant contaminated brine solution
9 to adjust a divalent to monovalent cation mole ratio to a numeric value greater than or equal to 0.05
10 to form a stabilized, pollutant contaminated brine solution;

11 contacting the stabilized, pollutant contaminated brine solution with an effective amount of
12 a pollutant degrading culture under anaerobic/anoxic conditions for a time and at a temperature
13 sufficient to degrade a concentration of the pollutant to or below a desired concentration to form a
14 crude treated brine solution; and

15 filtering the crude treated brine solution to remove the culture and to form a treated brine
16 solution.

1 28.(original) The method of claim 27, further comprising the step of:

2 repeating the step of claim 26, where the brine solution comprises the treated brine solution.

1 29.(original) A method comprising the steps of:

2 feeding a waste water stream including at least one ion-exchangeable pollutant with a first
3 column including a first ion-exchange resin able of exchanging the pollutant ion for a non-pollutant
4 ion for a predetermined time or until the resin is no longer to exchange the pollutant ion with the
5 non-pollutant ion;

6 switching the waste water stream feeding from the first column to a second column including
7 a second ion-exchange resin capable of exchanging the pollutant ion for a non-pollutant ion for a
8 predetermined time or until the resin is no longer to exchange the pollutant ion with the non-
9 pollutant ion;

10 passing a brine solution through the first column for a time sufficient to exchange all or
11 substantially all of the pollutant ion with the non-pollutant ion to form a pollutant contaminated brine
12 solution and to regenerate the first resin;

13 adding an effective amount of a divalent cation to the pollutant contaminated brine solution
14 to adjust a divalent to monovalent cation mole ratio to a numeric value greater than or equal to 0.05
15 to form a stabilized, pollutant contaminated brine solution;

16 contacting the stabilized, pollutant contaminated brine solution with an effective amount of
17 a pollutant degrading culture under anaerobic/anoxic conditions for a time and at a temperature
18 sufficient to degrade a concentration of the pollutant to or below a desired concentration to form a
19 crude treated brine solution;

20 filtering the crude treated brine solution to remove the culture and to form a treated brine
21 solution;

22 switching the waste water stream feeding from the second column to first column; and
23 repeating the above-identified steps.

1 30.(original) The method of claim 27, wherein the first and second ion-exchange resins are the
2 same.